

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
OAKLAND DIVISION**

EPIC GAMES, INC.,

Plaintiff, Counter-defendant,

vs.

APPLE INC.,

Defendant, Counterclaimant.

No. 4:20-CV-05640-YGR-TSH

**WRITTEN DIRECT TESTIMONY OF
RICHARD SCHMALENSSEE, PH.D.**

Trial Date: May 3, 2021

Time: 8:00 a.m.

Courtroom: 1, 4th Floor

Judge: Hon. Yvonne Gonzalez Rogers

Ex. Expert 8

I. Summary of Opinions

1. My testimony focuses on the economics of two-sided platforms and their importance to questions of antitrust market definition, market power, and competitive effects raised by this case. This testimony is informed by my decades of scholarship on platform businesses—much of it with Epic’s expert, Professor David Evans. I also conducted an economic analysis of Epic’s tying allegations. Based on my expertise and available evidence, I have reached the following opinions:

The Economics of Two-Sided Transaction Platforms

2. **Opinion 1.** Two-sided platforms serve two different groups who need each other in some way, and their core business is to facilitate interactions between members of those two groups. Platforms generally exhibit indirect network effects: the value of a platform to one group of users increases as the number of users in the other group increases. To ensure balanced participation, two-sided platforms must carefully choose the prices that they charge each side and must take account of feedback loops that can flow from price increases on either side. (§ III.A, pp. 5-6).
3. **Opinion 2.** Two-sided *transaction* platforms facilitate simultaneous, observable transactions between members of the two groups or “sides.” Transaction platforms exhibit strong bilateral indirect network effects, which make them more complex than ordinary, one-sided businesses. Strong network effects create feedback loops that amplify demand reductions when prices are raised. (§ III.B, pp. 6-8).
4. **Opinion 3.** The App Store is a two-sided transaction platform. In economic terms, transactions platforms such as the App Store should be analyzed as supplying only one product—transactions—and operating in a single market where both sides must be assessed together. In this case the relevant product market in which the App Store operates is digital game transactions. (§ IV, pp. 8-13).
5. **Opinion 4.** Two-sided platforms often set rules that may directly inconvenience one of the groups they serve but ultimately benefit that group via indirect network effects. For instance, the App Store’s app review process may inconvenience some developers, but it makes the Store more attractive to consumers, which ultimately benefits developers. (§ IV.B, pp. 11-12).

Dr. Evans’ Treatment of Platforms

6. **Opinion 5.** Dr. Evans’ identification of a distinct mobile operating system foremarket and an iOS app distribution aftermarket—both two-sided markets with developers on one side and consumers on the other—is artificial and misconceived. It confusingly bifurcates a single transaction platform and ignores transaction platforms on non-smartphone devices that are accessible by consumers and developers. As for smartphones, Dr. Evans’ identification rests on unsupported assertions regarding device competition and switching costs, and it ignores indirect network effects and the transactional nature of the product at issue. (§ V.A, pp. 13-15).

7. **Opinion 6.** Dr. Evans' discussion of differences among devices is unrelated to the issues in this case, where the relevant product is not "distribution" or "apps" but rather digital game transactions between groups of developers and consumers. (§ V.B, pp. 15-16).
8. **Opinion 7.** Dr. Evans' analysis ignores much of his (and my) own work on platforms, which implies that often unpredictable effects can flow from alterations to platform business models. Dr. Evans takes no real heed of the risk that his analysis would not just destabilize Apple's iOS business model but would condemn all "walled garden" business models, particularly those of the game console manufacturers. (§ V.C, pp. 16-17).

Market Definition

9. **Opinion 8.** Dr. Evans' prior research makes clear that any market definition exercise involving platform businesses must take explicit account of the strength of indirect network effects and associated feedback loops to avoid defining markets that are too narrow. The foremarket and aftermarket SSNIP tests Dr. Evans performed for this case are fatally flawed because they do not do this. (§ VI.A.1-2, pp. 17-21).
10. **Opinion 9.** Dr. Evans' foremarket SSNIP test is unrelated to any issues in this case, and it is unreliable because one of the products in his imaginary foremarket (iOS) has never been sold separately while the other (Android) has always been given away for free. Dr. Evans' aftermarket test asks whether the App Store is maximizing profit (and answers that question in an unreliable way). This question is not relevant to any issue in this case. (§ VI.A.3, pp. 21-24).
11. **Opinion 10.** Game transactions face different competitive conditions compared to transactions for other apps or app categories (which involve other groups of developers and consumers). The relevant market in this case for evaluating Apple's restrictions on app distribution is digital game transactions. (§ VI.A.4, pp 24-25)
12. **Opinion 11.** Even though it is not possible on this record to conduct a correct SSNIP test, available evidence makes it clear that the relevant product market for digital game transactions is broader than transactions on the App Store alone. (§ VI.A.4, pp. 24-25)

Market Power

13. **Opinion 12.** Dr. Evans' assessment of the App Store's market power rests on an estimate of its operating margin, but operating margins do not measure profitability. Moreover, the iOS ecosystem abounds with what economists call "joint costs" which cannot be allocated in an economically meaningful way among the multiple products that those costs support. Mr. Barnes' estimate of the App Store's operating margin is unreliable because it looks in isolation at one segment of the iOS ecosystem in a way that artificially boosts the apparent operating margin of that segment. When one looks at Apple's device and services ecosystem as a whole, the operating margin falls to an unremarkable level. (§ VI.B.1-2, pp. 25-28).
14. **Opinion 13.** The fact that Apple's iOS business has a relatively complicated monetization strategy and that its strategy differs from those of other operating system vendors does not imply that it has market power. (§ VI.B.2, pp. 27-28).

15. **Opinion 14.** Properly calculated, Apple’s market share is certainly below 40 percent and arguably below 30 percent. Moreover, online platforms with strong indirect network effects and low barriers to entry can experience rapid changes in market share, so a high market share would not imply durable market power. (§ VI.B.3, pp. 28-29).

Competitive Effects

16. **Opinion 15.** Under Apple’s policies at issue, which were established before Dr. Evans claims the App Store attained monopoly power, the number of iOS app developers and the volume of iOS app transactions have grown enormously. This is in conflict with Dr. Evans’ past emphasis on the significance of observed output growth in competitive effects analysis. Dr. Evans has provided no economic evidence of anticompetitive effects and has ignored voluminous evidence of a healthy, thriving iOS ecosystem. (§ VI.C, p. 30).

Epic’s Tying Claim

17. **Opinion 16.** IAP is not a “separate product,” but rather an integral part of the App Store transaction platform that provides benefits to users and developers. IAP is a critical input into the production of App Store transactions. An in-app purchase of digital content, functions, or services using IAP constitutes, in effect, an upgrade of a previously downloaded app. The fact that Apple chooses to monetize some transactions and not others does not mean that IAP is a separate product. (§ VII.A, pp. 31-35).
18. **Opinion 17.** The IAP requirement for digital content or services enables efficient collection of Apple’s commissions. All major online stores that charge sellers commissions also require the use of their own payment mechanisms to enable efficient collection of those commissions. The anti-circumvention rules in the App Store and other online stores prevent free-riding, like the anti-steering rules in the *Amex* case. (§ VII.A.1, pp. 32-35).
19. **Opinion 18.** As in other online stores, the App Store’s commissions are not fees for payment processing. Thus Dr. Evans’ SSNIP analysis comparing the App Store’s commissions to competitive payment processing rates is fatally flawed. (§ VII.C, pp. 38-40).
20. **Opinion 19.** There is no tie between IAP and iOS app distribution because they are not separate products. The fact that Epic and other developers have tried to circumvent IAP is not valid evidence of a separate demand for payment processing; it merely shows they want to avoid Apple’s commission. Even if IAP and app distribution were separate products, they have not been tied, as developers that use the App Store can—and do—choose forms of monetization that do not require use of IAP (§ VII.B, VII.D, pp. 36-38, 40).

II. Background and Qualifications

21. I am the Howard W. Johnson Professor of Management Emeritus and Professor of Economics Emeritus at the Massachusetts Institute of Technology (MIT), where I have taught industrial organization and related subjects since 1977. I served as the Dean of the MIT Sloan School of Management from 1998 through 2007.
22. I was a Member of the President's Council of Economic Advisers from 1989 through 1991. I am a Fellow of the Econometric Society and the American Academy of Arts and Sciences and was the 2012 Distinguished Fellow of the Industrial Organization Society. I have served as an elected member of the Executive Committee of the American Economic Association and am currently a member of the Executive Committee of the Board of Directors of the National Bureau of Economic Research. I have S.B. and Ph.D. degrees in economics from MIT.
23. I am the author or co-author of 13 books, more than 110 published articles, more than 35 book chapters, and many shorter papers. Since 1977 I have testified in a number of antitrust cases and related matters. I have also testified before the U.S. Congress and state and federal regulatory agencies. In the last two decades, much of my work, including my three most recent books, has focused on platform-based businesses, which are defined below. Much of this recent work, including the *Invisible Engines* and *Matchmakers* books and an amicus brief to the Supreme Court in the *Ohio v. American Express (Amex)* case, has been joint with Dr. Evans.

III. The Economics of Two-Sided Platforms

A. General Properties

24. Owners of iOS devices benefit from being able to acquire high-quality apps. Developers of iOS apps benefit from being able to reach a large number of consumers. Apple's App Store exists to facilitate transactions between members of these two groups.
25. Two-sided platforms serve distinct groups of customers who need each other in some way, and their core business is to provide a common (real or virtual) meeting place that facilitates interactions between members of the two distinct customer groups. For a platform to be attractive to both groups it seeks to serve, it must reduce frictions that impede their desired interaction and structure the prices it charges to both sides so as to make the platform attractive to both.
26. A key feature of two-sided platforms is that they often exhibit what economists call "indirect network effects." Indirect network effects refer to the situation in which the value realized by members of one group of customers of a platform is higher when they have access to more members of the other group of customers with whom they could productively interact. Successful two-sided platforms must ensure that there are a large number of participants on both sides of the platform and that transactions on the platform are as easy, safe, and reliable as possible.
27. Because of indirect network effects, the multi-sided platform business model is much more complex than the business model of a brick-and-mortar retailer or other single-sided

businesses. Platforms must select pricing strategies, service provision, and rules of behavior so as to ensure balanced participation of the customer groups they serve. If a platform is required to alter one element of its overall strategy—pricing to one side or rules of behavior affecting another side, for instance—it may find it desirable or even necessary to respond by altering other elements of its strategy, with diverse (perhaps unpredictable) effects on groups on both sides of its platform. Hence, even minor changes to a platform’s pricing strategy always require careful considerations from various viewpoints.

28. To ensure participation on both sides, so that each side finds participation on the platform attractive because of participation by the other side, platforms must carefully choose their price structures on both sides. Platforms’ price structures depend in part on the price elasticities of demand of the groups served. Like ordinary one-sided businesses, platforms will tend to charge higher prices, all else equal, to customers who are less sensitive to price, i.e., that have lower price elasticities of demand. In fact, it is common for one side of a two-sided platform to be charged less than marginal cost to encourage participation on that side, in order to make it attractive for the other side, which is charged above marginal cost, to also participate.
29. Indirect network effects that affect both groups served create feedback effects that amplify reactions to price changes. Suppose a platform serves groups A and B and it increases price to group A. This will reduce participation by members of group A. That, in turn, will make the platform less attractive to members of group B and will accordingly reduce their participation. And the process continues: less participation from B will make the platform even less attractive to members of group A, a reduction in A’s participation will make the platform even less attractive to members of B, and so on. It is possible that the result will be that both groups completely drop off the platform. For modest price increases, the process will generally converge, and the decline in participation by A will be greater than A’s price sensitivity would imply: demand is, in effect, more elastic. In addition, participation by group B will have fallen.
30. To prevent platform participants in one group from reducing the value of the platform to members of the other group, platforms often need to establish and enforce rules of behavior. Such rules are often necessary because the interests and incentives of both sides don’t always align. For instance, OpenTable suspends a user’s account if the user is a no-show for four reservations within a 12-month period. That may be a mild inconvenience for *some* consumers, but it makes the platform more valuable to restaurants, and if more restaurants participate, the platform is more valuable to *all* consumers. Both eBay and Amazon Marketplace similarly have detailed rules with which sellers must comply in order to retain access to these platforms.

B. Two-Sided Transaction Platforms

31. Economists recognize a particular type of multi-sided platforms (often referred to as “transaction platforms”) that primarily facilitate observable transactions, often sales transactions, between the two groups of platform users.
32. Transaction platforms exhibit particularly pronounced indirect network effects: the value of participation on a transaction platform increases not only with the number of users on the

other side of the platform, but also with the usage of the platform on the other side. As a result, transaction platforms are typically able to charge one or both sides both an access fee for joining the platform and a usage fee for using it. Payment cards and auction houses are familiar examples of transaction platforms discussed in the academic literature.¹

33. It is important to emphasize that the product supplied by a transaction platform to the two groups it serves is transactions. This is distinct from the exchange the platform facilitates as a consequence between members of those groups. Payment cards like Amex facilitate purchases and sales of a wide variety of goods and services, but they do not supply or demand those goods or services. Transaction platforms generally compete with other transaction platforms to facilitate transactions between the same general groups—merchants and consumers in the payment card context, for example.
34. In our *amicus* brief in the *Ohio v. American Express* matter, Dr. Evans and I concluded that for platforms that provide services that are “consumed jointly and unseverably”² by members of two distinct groups—a slightly different way of describing transaction platforms—it makes no economic sense to consider inputs into transactions production in isolation, as an exclusive focus on conduct with respect to only one of the groups involved (merchants in the *Amex* case) would do.
35. An art gallery that displays and manages the sale of paintings owned by others is an instructive example of a transaction platform. It is a platform because it exists to facilitate interactions between artists and art buyers by choice of venue, curation, and other means. It is a transaction platform because its business is to sell paintings. It is properly analyzed as producing a single product: sales of paintings.
36. As a two-sided platform, a gallery creates value through the indirect network effects that it offers to artists and art buyers in competition with other galleries and, perhaps, other channels through which artists and art buyers can interact. Both artists and art buyers benefit from the platform that the gallery offers for members of the two groups to interact. In addition to facilitating the sale of artwork, galleries—as transaction platforms—typically also offer a variety of services to artists and collectors on an ongoing basis. These services ultimately benefit all parties as they can lead to potential transactions in the future. To capture some of this value, galleries typically monetize by retaining between 30 percent and 60 percent of the artwork’s sales price. This commission is much higher than the payment processing fees that the gallery pays as it compensates the gallery for all its services to artists and art buyers.

¹ Not all two-sided platforms are transaction platforms. Newspapers link advertisers and readers, but no transaction between them happens on the newspapers’ platforms. Similarly, shopping malls facilitate interaction between shoppers and merchants but are not involved in any transactions between those two groups.

² Brief for *Amici Curiae* Prof. David S. Evans and Prof. Richard Schmalensee in Support of Respondents, *State of Ohio et al. v. American Express Company et al.*, No. 16-1454, Supreme Court of the United States, January 23, 2018, at p. 5.

37. A gallery does not need to charge a commission, however. It could instead choose to charge art buyers a fee to enter the gallery (*i.e.*, an access fee). However, this monetization strategy could be counterproductive, as it might reduce the number of art buyers, which in turn would likely reduce the value of the gallery to artists. Charging a percentage commission per transaction, on the other hand, is much more in line with economic fundamentals.
38. Having chosen to charge a commission, galleries generally require that purchases using a payment card be processed via the gallery's payment terminal. If instead the buyer were permitted to deal directly with the artist, in violation of this anti-circumvention rule, the artist could avoid paying the gallery's commission. Of course, if the gallery were able to collect its commission even if the buyer paid the artist directly, it would make no economic sense for the artist to take direct payment.
39. An artist who takes payment directly from a buyer for a work that a gallery had displayed would avoid paying for the gallery's display and other services and would thus be free-riding. Free-riding artists would undermine the investments of galleries in display services for artists, which would ultimately harm art buyers and artists alike. In this sense, the gallery's anti-circumvention rule is like the anti-steering provisions that Amex has in place to deter merchants from "steering" customers away from using their Amex cards and thereby making the network less attractive to customers and other merchants.
40. In addition, the gallery's payment card terminal may generate data that is valuable to the gallery and to artists, but, strictly speaking, it does not process payments. That is, it does not arrange the transfer of wealth from the buyer to the gallery. The gallery owner—and probably the artist—would be astonished to hear that the gallery's commission should be thought of as a markup on the use of its payment processing terminal. The gallery's commission simply reflects what the gallery views as the optimal monetization strategy for the value that it offers to both sides of its transaction platform.

IV. The App Store Is a Two-Sided Transaction Platform

41. As **Exhibit 1** shows, game console manufacturers, among others, had launched online stores for app distribution before the debut of the App Store in 2008. Many other online game stores have launched since. Many stores have posted commission rates of 30 percent, which became a standard in the games industry.³

³ Marks, Tom, "Report: Steam's 30% Cut Is Actually the Industry Standard," *IGN*, January 13, 2020, available at <https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard>.

Exhibit 1: Overview of Digital Distribution Platforms

Platform	Operating System/Device ^[1]	Year Introduced	Year Discontinued	Commission Rate ^[2]
Consoles				
Xbox Live Marketplace ^[3]	Xbox	2005		30%
PlayStation Store	PlayStation	2006		30%
Nintendo Wii Shop Channel	Nintendo (Wii)	2006	2019	30%
Nintendo eShop	Nintendo	2011		30%
Mobile				
Handango InHand ^[4]	Android, BlackBerry OS, Palm, Symbian, Windows Mobile, Java	1999	2017 or earlier	30-40%
GetJar	Android, Java, Symbian, BlackBerry, Windows Mobile, Linux	2005		0%
Apple App Store	iOS	2008		30%
Google Play ^[5]	Android	2008		30%
BlackBerry World	BlackBerry 10 OS	2009		30%
Ovi Store ^[6]	Symbian (Nokia)	2009	2015	30-40%
HP App Catalog	Linux/webOS	2009	2015	30%
Galaxy Store ^[7]	Android, Tizen, Windows Mobile, Bada	2009		30%
Windows Phone Marketplace ^[8]	Windows Phone	2010		30%
Aptoide	Android	2010		25%
Opera Mobile Store	Android, Java, BlackBerry OS, iOS, Symbian, Windows Phone	2011		30-50%
Amazon Appstore	Android, BlackBerry 10	2011		30%
LG SmartWorld ^[9]	Android	2011		30%
Huawei AppGallery ^[10]	Android	2011		20-50%
OpenStore for Ubuntu Touch	Unix/Open-Source	2013 or earlier		N/A
PureOS Software Center	Linux/Open-Source	2017 or earlier		N/A
PC				
Battle.net (Blizzard)	Windows, Mac, Android, iOS	1996		N/A*
RealArcade ^[11]	Windows, Mac	2001		"Not free"
Metaboli Gamesplanet ^[12]	Windows, Mac, Linux	2001		"Small Portion"
Big Fish Games	Windows, Mac	2002		N/A
Steam	Windows, Mac, Linux, Steam, SteamVR-compatible	2003		20-30%
Game Jolt	Windows, Mac, Linux	2003		0-10%
iPlay ^[13]	Windows	2003		N/A
Direct2Drive	Windows	2004		N/A
Windows Marketplace ^[14]	Windows	2004		30%
GamersGate	Windows, Mac, Linux	2006		30%
Kongregate	Web-based	2007		30%
GameStop PC Downloads ^[15]	Windows	2008	2014	N/A
GOG.com	Windows, Mac, Linux	2008		30-40%
Ubuntu Software Center	Ubuntu	2009		N/A
Green Man Gaming	Windows, Mac, Xbox, PlayStation, Oculus, VIVE, Windows MR	2010		30%
Beamdog	Windows, Mac, Linux	2010		N/A*
Desura	Windows, Mac, Linux	2010	2016	30%
Humble Bundle ^[16]	Windows, Mac, Linux, Nintendo, Android, Oculus, VIVE, Windows MR	2010		25%
DotEmu	Windows	2010	2017	N/A
Mac App Store	Mac	2011		30%
Playism	Windows, Mac, Linux, Xbox, Playstation, Nintendo	2011		N/A
Origin	Windows, Mac	2011		30%*
Ubisoft Connect ^[17]	Windows, Xbox, PlayStation, Nintendo, Oculus, VIVE	2012		30%*
itch.io	Windows, Mac, Linux, Android	2013		Developers choose; 10% default
Snap Store	Ubuntu/Linux	2014		N/A
Bethesda.net	Windows	2016		N/A*
Kartridge	Windows, Mac	2018		0-30%; Tiered
Epic Games Store	Windows, Mac	2018		12%
Virtual Reality^[18]				
Oculus (Facebook) ^[19]	Oculus	2016		30%
VIVEPORT (HTC)	VIVE, Oculus, Valve Index, Windows Mixed Reality	2016		30%

Source: DX-4855, DX-4856, DX-4857, DX-4858, DX-5859

42. With the launch of the App Store, Apple's iOS devices became a multi-sided software platform connecting developers and users, with the App Store facilitating those connections, like the platforms operated by the major game console producers and others.
43. Two-sided transaction platforms have three fundamental features: (1) two-sided transaction platforms need to adopt pricing strategies, service provision strategies, and rules of behavior to attract two distinct groups of users and to facilitate productive interactions between them; (2) they derive substantial value from strong bilateral indirect network effects; and (3) they have as their main purpose the facilitation of observable transactions that simultaneously

connect members of the two groups of users. These are often, but not always, sales transactions.

44. The App Store displays all three of these fundamental features and is thus clearly a two-sided transaction platform. First, to be viable, the App Store needs to attract both consumers and developers. Second, there are clear bilateral indirect network effects here: consumers want access to good apps (and the more good apps they have access to, the better), and developers want access to as many potential customers as possible. Third, the App Store generates value for both groups of customers when there is a transaction between a consumer and a developer—a download or an in-app purchase of digital content from a developer.

A. The App Store Works to Attract Consumers and Developers

45. With the launch of the App Store, Apple established a two-sided platform that thrives based on the participation of both developers and device users. To remain competitive, Apple must continuously think about how to attract users and developers,⁴ and may apply different strategies over time or across product types.
46. One initiative that Apple has taken to make the iPhone live up to this description has been to actively court game developers. It worked to persuade Epic to offer its games on the iOS platform, for instance, as Epic's popular titles would make the platform more attractive to users, and thus encourage them to buy more iOS devices. In that context, Apple competes with PlayStation, Nintendo, Xbox, and Android handset makers such as Samsung to make *Fortnite* and other games as positive an experience as possible on iOS devices, so as to attract gamers to the iOS platform.⁵ An internal document also indicates that Sony competes with Apple's App Store in digital games.⁶ In other contexts, e.g., email applications, Apple does not compete with Nintendo but does compete with other handset manufacturers as well as manufacturers of tablets, laptops and desktop computers to attract email developers on the one hand, and consumers who wish to be able to send secure emails conveniently on the other.
47. As Apple's fact witnesses will testify, Apple has understood that consumers value security and privacy of their information, and it has responded and continues to respond accordingly. The App Store has been reviewing apps since its inception to provide consumers assurance that iOS apps perform as advertised and don't contain malware. Finally, over time Apple has introduced significant changes to the functionality and design of the App Store, including changes that facilitate the discovery and purchase of new apps and in-app content, to make it more appealing to end-users.⁷

⁴ DX-4094 at 051-052, 080, 082-087, 098.

⁵ See, e.g., DX-3796 at 003-004.

⁶ DX-4389 at 001-002.

⁷ See, e.g., DX-4526, at 095; DX-3202; DX-4178 at 019.

48. Critically, the competition between software platforms does not end when one platform's app is selected by a user at some point in time. In fact, many users own devices running on multiple operating systems, and can choose whether to use Device A or Device B to play a game, draft an email, and so on. Hence, the platforms compete for usage *in addition to* app purchases, because declining usage will reduce the attractiveness of the platform to developers.
49. Through the App Store, Apple must also provide app developers incentives to develop and maintain their apps for the iOS platform, instead of competing platforms such as Android or Windows or, in the case of games, the Xbox, Switch, or PlayStation systems. Competing platforms do not generally seek to persuade developers to permanently abandon rival platforms. Sometimes Apple, Google, Samsung, and other platforms seek to persuade a developer to develop for its platform first, to provide content that differentiates it from other platforms, or to provide exclusivity for a limited period.

B. The App Store Has Strong Bilateral Indirect Network Effects That Have Shaped Its Business Model

50. Greater consumer participation makes the App Store more attractive to developers, and greater developer participation means more high-quality iOS apps that make the App Store and iOS devices more attractive to consumers.
51. The App Store's pricing policy is designed to encourage participation. In order to encourage consumers' participation, the App Store does not charge consumers access or transaction fees, and its pricing structure encourages free apps. On the developer side, Apple provides an array of powerful tools to create iOS apps at no charge, as well as promotional support, and when developers pay a nominal fee of \$99 per year they can offer their apps on the App Store. In the art gallery example, this would be like a gallery giving paint, brushes, and canvas for free to promising artists that agree to let it show their work.
52. Like other transaction platforms, Apple also establishes and enforces clear rules of behavior to prevent platform participants from reducing its value for others. The app review process is one example, and illustrates the importance of indirect network effects. Although the app review process can be burdensome for app developers, once reviewed and certified, a well-curated App Store with high-quality, bug-free iOS apps attracts more users and, ultimately, more potential business for app developers. Developers have recognized that, much like Open Table's rule regarding diner no-shows, the review process, while onerous, creates value. For example, in surveys I have reviewed, developers expressed dissatisfaction with the limited review process in Android Market (the precursor to Google Play), with one remarking: "Yes, it's easier on the developer, but it's detrimental to the whole ecosystem."⁸
53. "Stores within a store" could direct consumers to less safe or lower quality apps that had not gone through the review and curation process. While some developers may chafe at the App Store's banning of such stores, according to Mr. Sweeney, the fairness of a policy that

⁸ DX-4626, at 092.

bans stores within a platform's store depends on "whether such a decision would have overall positive consumer benefits or negative consumer benefits and follows the expectations of consumers."⁹ Other platforms through which Epic does business impose restrictions similar to those imposed by the App Store.¹⁰

54. Dr. Evans notes that some of the conveniences that Apple offers for its App Store users impose costs on developers.¹¹ However, customer-friendly features like "Sign in with Apple" along with other benefits such as parental controls and easy cancellation of subscriptions will ultimately also benefit developers through increased customer satisfaction via indirect network effects. This is similar to the restrictions on consumers for OpenTable that I discussed above. Even though restrictions on one side of Apple's two-sided platform might be a mild inconvenience for some developers, they make the platform more valuable to consumers, and if more consumers participate, the platform is more valuable to all developers.

C. The App Store Has as Its Main Purpose Facilitating Observable Transactions Between Developers and Consumers

55. Lastly, the App Store facilitates transactions between end users and developers—like Amex, the App Store neither buys nor sells content; it facilitates transactions involving a range of products. Transactions between iOS users and developers on the App Store include user downloads of apps that are supplied by developers on the App Store, updates of apps that are supplied by developers on the App Store, and in-app purchases of additional content by iOS users. Developers, consumers, and Apple benefit from the App Store only when transactions occur.
56. Similar to other transaction platforms, the App Store simultaneously connects iOS users and developers and facilitates observable transactions between these two sides. The App Store also exhibits particularly pronounced indirect network effects: the value to developers of participation on the App Store increases with the usage of the App Store by iOS users.
57. As such, the App Store price structure must reflect Apple's view of relative price sensitivities as well as the nature and strength of indirect network effects on the two sides. In order to offer apps in the App Store, developers must pay a nominal annual access fee (\$99) to join the Apple Developer Program. When transactions involving apps they have offered on the App Store occur, developers are charged commissions that vary with the nature of the transactions. Like most other online stores, the App Store requires the use of its own payment system (In-App Purchase, or "IAP," for in-app transactions) in order to efficiently collect the commissions it is owed.

⁹ Deposition of Tim Sweeney, February 8, 2021 ("Sweeney Deposition"), at 72:19-73:4.

¹⁰ DX-3298; "DX-4922; DX-3583, at 002; DX-3437, at 001, 003.

¹¹ Written Direct Testimony of Dr. David S. Evans, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, May 3, 2021 ("Evans Testimony"), at ¶ 199.

58. Economic analysis of the App Store and its policies must reflect the reality that it is a two-sided transaction platform with strong bilateral indirect network effects. Because of the complexities of two-sided platform business models, economic analysis of such businesses is inevitably more complex than the analysis of familiar single-sided businesses like manufacturing firms. Concluding that the App Store is a two-sided transaction platform is just the starting point for analyzing antitrust questions of product market definition, market power, and competitive effects. The key is the careful application of these principles while bearing complexities of platform businesses in mind.

V. Dr. Evans' Treatment of Platforms and Markets is Internally Inconsistent and Disconnected From the Issues in This Case

59. During the preliminary injunction phase, Dr. Evans declined to express an opinion about whether the App Store is a two-sided transaction platform. I am pleased that Dr. Evans now admits that the App Store is a two-sided transactions platform,¹² and I agree that the iOS system, after the introduction of the App Store, is also a platform.¹³
60. Dr. Evans asserts that Apple participates in two two-sided markets that link consumers and app developers: a foremarket for “smartphone OSs” and an aftermarket for distribution of iOS apps.¹⁴ He seems to be seeking to direct attention away from Apple’s impacts on transactions between Epic and similarly situated game developers and consumers—impacts with which this case is exclusively concerned. As I show in what follows, this artificial structure makes no economic sense.

A. Dr. Evans' Assertion of Separate Foremarkets and Aftermarkets Is Artificial and a Distraction from the Issues in this Case

61. Dr. Evans devotes over 12 pages of his written testimony to discussions of competition and market power in what he defines as a foremarket for smartphone operating systems.¹⁵ Dr. Evans’ foremarket has one particularly unusual, if not unique, feature. Apple’s iOS is not licensed to OEMs or sold separately to consumers, and Google’s Android OS is not licensed to OEMs at a positive price and is not sold separately to consumers. Thus Dr. Evans has asserted a very unusual market: neither of the products that he asserts dominate the market are in fact sold or licensed at a positive price.

¹² Evans Testimony, at ¶ 7.i.C.

¹³ Note, though, that Dr. Evans’ revised framing is inconsistent with Epic’s Complaint, which deals only with a single-sided “iOS App Distribution Market,” in which Apple provides “services that allow users to find new apps they desire to download and that make new apps and app updates seamlessly available for download and update.”

¹⁴ Evans Testimony, at ¶¶ 40, 43-44, 92.

¹⁵ Evans Testimony, at ¶¶ 40-91.

62. Dr. Evans also defines an aftermarket for “iOS app distribution.”¹⁶ This terminology misses the main purpose of the App Store as a two-sided transaction platform. Focusing only on the services provided to developers is precisely the economic error committed by plaintiffs in *Amex* when they focused only on the merchant side of payments card platforms.
63. Dr. Evans’ division of the Apple ecosystem into fore- and aftermarkets is inconsistent with the existence of strong bilateral indirect network effects, which he seems to accept.¹⁷ It is uncontested that improving the quantity and quality of apps available for a particular operating system stimulates sales of phones or other devices that use that operating system. Similarly, improving the devices that use a particular operating system (via better hardware or improvements to the bundled operating system) will make that operating system more attractive to developers. With strong indirect network effects, developer behavior affects consumer demand, even if some consumers face substantial switching costs, and consumer choices affect developer behavior. If fewer good apps are available for iOS devices, there will be less demand for those devices when consumers upgrade, as they do on average every four years. If fewer consumers use iOS devices, developers can easily switch efforts to other platforms. This does not require abandoning that platform, merely altering priorities regarding where an app first appears, where marketing efforts are focused, and similar adjustments at the margin.
64. Dr. Evans asserts that his fore- and aftermarkets are separated in part because the foremarket for smartphone operating systems is not competitive, so foremarket competition does not discipline aftermarket prices.¹⁸ There is, of course, no real foremarket in which consumers pay for mobile operating systems. In the real world, consumers choose among bundles that consist of smartphones (or other mobile devices) plus mobile operating systems. This real market is far from a duopoly: Apple faces numerous large competitors who get their Android operating system for free, and Apple accounted for only 15 percent of global smartphone sales in 2020.¹⁹ Apple’s ability to compete in that marketplace depends on its ability to offer consumers a large selection of high-quality apps—and thus on making the App Store attractive to developers as well as consumers.
65. Even if competition for bundles consisting of devices and operating systems were not intense, it would have no implications for the issues in this case. This case is about transactions between app developers and consumers, not about competition among operating systems or devices that use them.

¹⁶ Evans Testimony, at ¶ 92.

¹⁷ Evans Testimony, at ¶ 7.i.C-D.

¹⁸ Evans Testimony, at ¶¶ 118-119.

¹⁹ “Gartner Says Worldwide Smartphone Sales Declined 5% in Fourth Quarter of 2020,” *Gartner*, February 22, 2021, available at <https://www.gartner.com/en/newsroom/press-releases/2021-02-22-4q20-smartphone-market-share-release>.

66. Dr. Evans seems to suggest that the mere existence of switching costs on one side of a transaction platform automatically means that there are economically distinct fore- and aftermarkets.²⁰ In the first place, it is important to keep in mind that switching costs may reflect product differentiation, as some consumers are particularly attached to the unique features or functions provided by their favorite platform. Being reluctant to switch because I prefer the product I use to available substitutes hardly signifies a competitive problem. The development of unique features that may make consumers reluctant to switch is a central focus of competition in technology-intensive products; switching costs that derive from them are a symptom of competition, not a sign of its absence.
67. Moreover, the magnitude of switching behavior, as measured by the willingness of participants on either side to switch to platform B due to an increase in price of platform A, will determine whether or not platforms A and B are in the same market. Dr. Evans' failure to estimate switching costs (which surely vary among consumers and developers) or indirect network effects on either side of the platform (despite accepting that both his markets center on two-sided transaction platforms, for which indirect network effects are strong by definition) demonstrates why his division of fore- and aftermarket is artificial.
68. The correct way to analyze iOS and the App Store is as a single, integrated, two-sided transaction platform, in which the App Store is Apple's mechanism for facilitating transactions between developers and end-users. There is only a single two-sided transaction platform that facilitates interactions between developers and end users in the iOS ecosystem, rather than two—as Dr. Evans suggests—that overlap almost completely. And, since Epic's allegations concern this transaction platform, the product market must center on the transactions facilitated by this platform. Similarly, any assessment of the boundaries of the market must include an analysis that seeks to identify transactions facilitated by other transaction platforms that are sufficiently substitutable from the perspective of developers and end users.

B. Dr. Evans' Discussion of Smartphones and Other Devices Is Another Distraction

69. In his discussion of his foremarket for smartphone operating systems, Dr. Evans frequently conflates smartphone operating systems with smartphone devices.²¹ In fact, Dr. Evans devotes a large part of his discussion of the definition of the foremarket whether other devices are practical substitutes for consumers and whether developers can use other devices to provide services to consumers who have smartphones.²²
70. The relevant question for the purposes of defining antitrust markets is not which devices are functionally equivalent, but rather what transactions facilitated by other platforms are reasonably substitutable for those facilitated by the App Store from the perspective of

²⁰ Evans Testimony, at ¶¶ 73, 118.

²¹ Evans Testimony, at ¶¶ 49-57.

²² Evans Testimony, at ¶¶ 50-53, 55, 58, 60-61.

developers and end users. Some of those other platforms involve desktop computers, laptops, game consoles, and tablets.

71. Rather than focusing on reasonably substitutable transactions from the perspective of developers and end users, Dr. Evans focuses on the functional differences between the hardware associated with various platforms, and argues that developers have no other way to reach iOS users because users cannot easily replace a smartphone with another device like a console or a PC. That a console or a PC is not functionally equivalent to a smartphone is of course true but irrelevant. Substitution does not need to occur literally with a user replacing their smartphone with a gaming console. Rather, the relevant dimension of substitution occurs at the transaction level, where, for instance, a user may choose to purchase V-Bucks on the Microsoft Store on Xbox rather than on the iOS App Store.
72. Therefore, Dr. Evans' claim that Apple has foreclosed access to approximately 1 billion iPhone users globally²³ is simply wrong. In fact, as shown by Professor Hitt, the vast majority of iOS users already have access to multiple types of devices that can be used to conduct game transactions, including smartphones, tablets, personal computers, laptops, and gaming consoles. Moreover, not only do consumers have access to multiple devices, Professor Hitt also shows that consumers also regularly make transactions through multiple online transaction platforms.

C. Dr. Evans' Analysis Condemns All "Walled Garden" Business Models, Including Those of Game Console Manufacturers

73. If one were to follow Dr. Evans' foremarket/aftermarket logic, one would have to conclude that all game console manufacturers monopolize the distribution of games on their platforms.
74. The core economic issue in this case is whether the iOS "walled garden" model, adopted well before Apple sold its first 4G phone and similar to the models of the game console makers, now constitutes an antitrust violation. As this Court already noted, all game console manufacturers impose restrictions designed to ensure that purchases of apps and in-app upgrades for their operating systems platform must go through their app marketplaces. Like Apple, they also moderate content and prohibit stores-within-a-store as well as sideloading.²⁴ All charge commissions on purchases of apps and in-app upgrades. Once a user has purchased a console and games that can be played on it, she would incur switching costs to move to another console. In the presence of switching costs, which Dr. Evans contends limit the impact of "foremarket" competition on "aftermarket" competition,²⁵ their

²³ Evans Testimony, at ¶ 295.

²⁴ DX-4434; DX-3258, at 011.

²⁵ Evans Testimony, at ¶ 118.

business models contain the same exact core elements as the iOS business model that Epic contends violates the Sherman Act.

75. Dr. Evans seeks to downplay the drastic implications of his analyses, asserting simply that “The App Store is not just a typical platform like Nintendo, operating as a walled garden.”²⁶ He does not attempt to explain why the size and importance of the App Store relative to others that are similarly structured should matter for antitrust analysis, let alone attempt to indicate what size should be the threshold between legality and illegality for walled garden business models.
76. In short, Dr. Evans’ analysis implies that the “walled garden” business models operated by game console manufacturers should be demolished along with the App Store’s model, with unpredictable effects. The Court noted explicitly in its Preliminary Injunction Order that its “final decision should be better informed regarding the impact of the walled garden model given the potential for significant and serious ramifications for Sony, Nintendo and Microsoft and their video game platforms.”²⁷ Dr. Evans provides no meaningful analysis of those ramifications.

VI. Implications of the Fact that the App Store Is a Two-Sided Transaction Platform for Market Definition, Assessment of Market Power, and Analysis of Competitive Effects

77. The conclusion that the App Store is a two-sided transaction platform has important implications for defining the relevant market, evaluating claims of market power, and analyzing whether Apple’s conduct has harmed competition. Dr. Evans’ analysis of these issues does not do justice to those implications.

A. Implications for Defining Product Markets

78. In prior writings, Dr. Evans has shown that market definition analysis of markets involving platforms must take explicit account of the strength of indirect network effects, but he does not do so here. Moreover his foremarket SSNIP test is uncoupled from economic reality, and his aftermarket SSNIP test makes no sense.

1. Dr. Evans and Other Authors Show that Market Definition Involving Platforms Must Take Explicit Account of the Strength of Indirect Network Effects

79. Antitrust practitioners often rely on the hypothetical monopolist test to delineate the relevant product and geographic markets for single-sided businesses, particularly in the merger context. The test involves assessing whether a hypothetical profit-maximizing firm, not subject to price regulation, that was the only present and future seller of a set of products likely would find it profitable to impose at least a small but significant and non-transitory increase in price (SSNIP) on at least one product in the market. If a SSNIP on a candidate market does not increase the hypothetical monopolist’s profit, then the candidate market is

²⁶ Evans Testimony, at ¶ 294.

²⁷ Dkt. 118 at p. 18.

too narrow, and more products should be added into the candidate market until such a price increase would increase the hypothetical monopolist's profit.

80. Applying a conventional one-sided hypothetical monopolist test to only one side of a transaction platform is inappropriate because it ignores the indirect effect that a price increase would have on participation of the other side, which in turn would lower the participation of the tested side. By not accounting for indirect network effects, a one-sided hypothetical monopolist test would underestimate the loss in profits due to an increase in price. As a consequence, the one-sided hypothetical monopolist test might incorrectly predict a positive profit for the hypothetical monopolist, and the market would be defined too narrowly.
81. Even if applied on both sides of the transaction platform, though, correct application of the hypothetical monopolist test to markets involving platforms turns out to be quite complex.
 - The presence of indirect network effects may make its quantitative application impractically complex, since strengths of indirect network effects are typically hard to quantify.
 - Second, there is no consensus among economists about the price to which the SSNIP should be applied. In a two-sided market, a platform sets at least two prices (at least one for each side), thus determining both a price level and a price structure. It is not clear how, if at all, the hypothetical monopolist should be thought of as adjusting the price structure while raising the price level.
 - Finally, considering the App Store and other online stores, there is no single best measure of volume. Store revenue is an obvious measure, but it gives no weight to free downloads even though they benefit both developers and consumers—and thus benefit Apple.
82. Economists—including Dr. Evans—have proposed different versions of the hypothetical monopolist test for platform markets, but each is complex and requires multiple inputs that are generally difficult to estimate. And, as Dr. Evans and I have written, a two-sided SSNIP test “requires a complete structural model of the firms’ demands, including both cross-price effects and indirect network effects, a good deal more information than is necessary in the case of ordinary single-sided firms.”²⁸ These quantities are recognized to be hard to estimate.
83. In his testimony, Dr. Evans advances multiple SSNIP tests that he claims show that both his foremarket and aftermarket are relevant antitrust markets. But though his analysis may appear rigorous, it effectively ignores the indirect network effects that are vital here, is biased toward overly narrow markets, and thus provides no reliable, relevant evidence.

²⁸ See Evans, David S. and Richard Schmalensee, “The Antitrust Analysis of Multi-Sided Platform Businesses,” NBER Working Paper 18783, February 2013, available at https://www.nber.org/system/files/working_papers/w18783/w18783.pdf, at p. 24.

2. Despite His Prior Writings, Dr. Evans' SSNIP Tests Neglect Indirect Network Effects and Are Thus Conceptually Flawed

84. Dr. Evans' foremarket and aftermarket SSNIP tests are conceptually flawed because they completely neglect indirect network effects that he has admitted exist here and are thus inconsistent with the literature, including Dr. Evans' own research.
85. Strong indirect network results imply that the ultimate impact of a price increase to one side of a platform can be considerably greater than the initial impact. A price increase to one side, A, of a platform will reduce participation on that side, which will make the platform less attractive to participants on the other side, B, and they will reduce participation. This, in turn will reduce participation on side A, and so on. Since the Hypothetical Monopolist and SSNIP tests turn on responses to price increases, ignoring indirect network effects will generally lead to markets that are too narrow.
86. A simple example illustrates the problem—and Dr. Evans' error. Suppose a 10 percent price increase on side A of a two-sided platform reduces participation on that side from 100 to 95, reflecting an own-price elasticity of -0.5. Such a price increase might well be profitable. Now suppose that strong indirect network effects give rise to a within-platform, cross-side externality elasticity of 0.6. That is, a 10 percent reduction in participation on either side, all else equal, would lead to a reduction of 6 percent in participation on the other side. If participation on side B was also initially 100, the initial 5 percent reduction in participation on side A would thus then lead to a 3 percent ($=0.6 \times 5$) reduction on side B, from 100 to 97. But that reduction in participation on side B would make the platform less attractive to the group on side A. With a within-platform, cross-side externality elasticity of 0.6, the 3 percent reduction in participation on side B would lead to an additional 1.8 percent reduction in participation on side A. When the process converges, participation on side A will have declined by just over 7.8 percent, which may be enough to make the initial increase in the side A price unprofitable.
87. Dr. Evans, however, does not perform any actual SSNIP calculations that take into account both sides of the platform simultaneously for either the foremarket or the aftermarket. Instead, he conducts his foremarket and aftermarket SSNIP tests on the consumer side and on the developer side in isolation.²⁹ Then, he effectively dismisses indirect network effects by claiming that a SSNIP on both developers and consumers would be profitable because neither side would respond to the one-sided price increases he tested. This ignores the fact that strong indirect network effects imply that *any* impact on consumers would affect developers on the margin (and vice versa).
88. This failure invalidates Dr. Evans' results and conclusions. As Dr. Evans himself showed in multiple articles, employing a one-sided test and ignoring indirect network effects would

²⁹ Evans Testimony, at ¶ 139.

generally lead to markets that are too narrow.³⁰ To correct for this error, Dr. Evans previously prescribed a test calling for a total of 14 inputs, which includes additional inputs well beyond what a single-sided SSNIP test would require, with many specifically related to within-platform and cross-platform cross-side externality elasticities to capture the indirect network effects. Yet, as shown in **Table 1**, in his analysis for this matter, Dr. Evans completely abandons this methodology in his attempt to define his candidate markets.

Table 1 - Two-Sided Platform SSNIP Test and the Required Inputs³¹

Inputs	Side	Evans and Noel (2005 and 2007)	Dr. Evans' Foremarket SSNIP
Percentage Increase in Price	Consumer	✓	✓
	Developer	✓	✓
Margin	Consumer	✓	✓
	Developer	✓	✗
Revenue	Consumer	✓	✗
	Developer	✓	✗
Own-Price Elasticity of Demand	Consumer	✓	?
	Developer	✓	?
Cross-Price Elasticity of Demand	Consumer	✓	✗
	Developer	✓	✗
Within-Platform, Cross-side Externality Elasticity	Consumer	✓	✗
	Developer	✓	✗
Cross-Platform, Cross-side Externality Elasticity	Consumer	✓	✗
	Developer	✓	✗

³⁰ See Evans, David S. and Michael D. Noel, “Analyzing Market Definition and Power in Multi-Sided Platform Markets,” October 21, 2005, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=835504; see Evans, David S. and Michael D. Noel, “Defining Markets That Involve Multi-Sided Platform Businesses: An Empirical Framework with an Application to Google’s Purchase of DoubleClick,” November 2007, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1027933, at p. 12 .

³¹ Some inputs are marked as “?” because Dr. Evans does discuss them, but he offers no quantitative evidence which his prior writings argue are necessary inputs for a valid test.

89. There is no reason to believe that, had Dr. Evans performed a SSNIP analysis consistent with his prior writings, inclusion of non-zero indirect network elasticities would not have reversed his conclusions.

3. Dr. Evans' SSNIP Tests are Otherwise Unreliable and Uninformative

90. Besides ignoring the importance of indirect network effects, Dr. Evans' foremarket and aftermarket SSNIP tests are each deeply flawed in their own right. The first is unrelated to the issues in this case; the latter simply makes no sense.

a) The Foremarket SSNIP Test Is Uncoupled from Economic Reality

91. Dr. Evans describes his foremarket SSNIP test as an attempt to see whether Apple and Google could profitably increase the prices of their mobile operating systems by a small but significant non-transitory increase in price (a SSNIP).³² But whether or not a single seller of mobile operating systems or smartphones could profitably exercise monopoly power has no bearing on any issue in this case. Epic's Complaint makes no claim for relief regarding any alleged market for operating systems or devices. There is no such relevant market, and Dr. Evans' foremarket SSNIP test is merely part of an elaborate attempt to distract.
92. Dr. Evans' foremarket SSNIP test is defective as well as irrelevant. He ignores the fact that the relevant product is transactions, and attempts to apply a SSNIP to the price of the OS, rather than the transaction between developer and user.³³ He is forced to engage in numerical gymnastics to come up with his view of what such a price increase might mean, since Apple has never licensed iOS separately, and Google has never charged for an Android license.³⁴ Dr. Evans arbitrarily divides the price of handsets between hardware and a very low competitive price for iOS, which virtually guarantees that the SSNIP passes.³⁵ Had he used the Android price—zero—as a benchmark, passage (i.e. the SSNIP being profitable) would have been assured. Alternatively, and no more arbitrarily, one could decide that the implicit price of iOS should be the difference between, say, the price of an iPhone and the marginal cost of manufacturing it. With that much higher price, passage would have been much less likely.

³² Evans Testimony, at ¶¶ 66-67.

³³ Evans Testimony, at ¶ 67 (“It is appropriate to base the SSNIP on the price of the OS rather than the device”).

³⁴ Evans Testimony, at ¶ 67.

³⁵ Evans Testimony, at ¶ 67 (“It is possible to estimate the implicit competitive price for the OS based on license fees—about \$30—that Microsoft charged for Windows Phone before it exited. The fees developers pay are small, and they are fixed costs that cover all users, and can therefore be ignored in calculating the total price to app users and developers. It is appropriate to base the SSNIP on the price of the OS.”).

b) Dr. Evans' Aftermarket SSNIP Test Makes No Sense

93. As already noted, the hypothetical monopolist and SSNIP tests were originally designed to aid merger analysis by testing whether multiple firms in a candidate market, if acting together, could profitably raise price. The setup in Dr. Evans' aftermarket SSNIP test is very different. His proposed aftermarket for iOS app distribution has only one seller, the Apple App Store, which is thus, by his definition, a monopolist.³⁶ His SSNIP test thus can only be an attempt to assess whether the App Store, acting alone, could profitably increase price—as, he says, it could.³⁷
94. Dr. Evans conducts his aftermarket SSNIP test in three steps. First, he raises the price that consumers pay for all in-app purchases/subscriptions by 5 percent and, holding app supply constant, argues that the price increase would be profitable for the hypothetical monopolist.³⁸ Second, Dr. Evans increases the price of iOS app distribution for Epic by ten percent, and, holding app demand constant, argues that Epic would rather continue to use the App Store and pay the ten percent increase in the commission rate.³⁹ Finally, Dr. Evans argues a SSNIP on both developers and consumers would be profitable because neither side would respond to the one-sided price increases he tested.⁴⁰ This, of course, neglects the fact that indirect network effects amplify responses to price changes, so that *any* fall in consumer participation would make the App Store less attractive to developers, including Epic.
95. Dr. Evans concludes that “Apple could have increased its profits by [REDACTED] by imposing this price increase.”⁴¹ The hypothetical monopolist is of course Apple, and Dr. Evans holds app demand constant in his analysis because he neglects the fact that a reduction in development of iOS apps would reduce iOS device sales and thus reduce the demand for apps. This would lead to a shift in developer attention away from iOS, reducing App Store revenues—perhaps enough to make the SSNIP unprofitable.
96. But taken at face value, what, exactly does Dr. Evans' conclusion that the App Store could profitably raise prices mean? A single-firm SSNIP test is problematic because if any individual business is maximizing profits then, by definition, it could not increase profits by raising prices. In 1956, the Supreme Court fell victim to what economists have since dubbed the *Cellophane Fallacy* by neglecting this fact.⁴² Despite other evidence indicating

³⁶ Evans Testimony, at ¶ 119.

³⁷ Evans Testimony, at ¶ 141.

³⁸ Evans Testimony, at ¶¶ 136, 141.

³⁹ Evans Testimony, at ¶ 133.

⁴⁰ Evans Testimony, at ¶ 143.

⁴¹ Evans Testimony, at ¶ 141.

⁴² *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 1956. See, e.g., Baker, Jonathan, “Market Definition: An Analytical Overview,” *Antitrust Law Journal*, Vol. 74, No. 1, 2007, at p. 164.

that DuPont, the only producer of cellophane, was pricing cellophane well above competitive levels, the Supreme Court found that it was not a monopoly. It relied on evidence that consumers considered cellophane to have good substitutes to which many would have switched if DuPont had increased cellophane's price. If that had not been the case, of course, DuPont would have profitably increased price. In modern language, a proper SSNIP test would have predicted that a price increase for cellophane would have reduced DuPont's profits, and this prediction would have led automatically to the (apparently erroneous) conclusion that a market confined to cellophane was too narrow.

97. Dr. Evans' interpretation of his aftermarket SSNIP test suffers from an inverse *Cellophane Fallacy*. Dr. Evans claims that Apple is a monopolist in the aftermarket, and therefore Apple's profit-maximizing price should already be above the competitive level, and yet Dr. Evans' SSNIP test finds that Apple as a monopolist could still raise price even beyond the allegedly monopolistic price it already charges.
98. So how can Dr. Evans possibly conclude that the App Store, acting alone, would make more money by raising prices? There are only two possibilities. The first is that Dr. Evans is simply wrong: his neglect of indirect network effects, despite the prescriptions of his own writings, has, predictably, led him to underestimate the revenue losses due to price changes. The other shortcomings of his analysis could also have contributed to an incorrect result. The other possibility is that despite the defects in his analysis, Dr. Evans is right: the App Store could increase its profits over a short but non-transitory period by charging more. In this case it is not maximizing short-run profit. The App Store is part of the iOS platform, after all, not a stand-alone business. It is not implausible that competitive forces may be compelling Apple to hold the App Store commission rates below the ostensibly short run profit-maximizing levels in order to encourage app transactions to the benefit of the iOS business as a whole in the long run. That is certainly plausible behavior, indicating once again that it makes little sense to analyze App Store pricing in isolation.
99. Dr. Evans argues that, "it is likely that Apple has not increased its commission rate over the current 30% maximum given the high level of regulatory, media, and developer scrutiny it has faced over several years."⁴³ This explanation seems much less plausible than the one just given: it ignores the fact that the App Store is part of the iOS platform, that the 30 percent rate was established two years before Dr. Evans believes the App Store attained monopoly power,⁴⁴ and that the scrutiny to which he refers is a very recent phenomenon.
100. Does it matter which of these possibilities is correct? As a matter of antitrust economics, it does not. Apple has made the App Store the sole platform connecting iOS app developers that use Apple software with iOS device users, and it requires the use of IAP for in-app purchases. The App Store handles a substantial volume of commerce to the benefit of consumers, developers, and Apple itself. These facts are not in dispute. Whether or not the App Store is labeled a relevant antitrust market has no bearing on the economic analysis of

⁴³ Evans Testimony at ¶ 142.

⁴⁴ Evans Testimony at ¶ 112.

the effects of the policies of which Epic complains. Once Dr. Evans has affixed that label, he simply moves on to an analysis of competitive effects.

4. Dr. Evans Ignores the Fact that Digital Game Transactions Face Different Competitive Conditions Compared to Non-Game Transactions

101. It is important to recognize that a single transaction platform may face different competitive constraints for different types of transactions. If those competitive constraints differ substantially, it will be appropriate to consider the different transactions types to be in separate relevant markets.
102. This is not a novel point, nor is it specific to platforms. It is my understanding, for instance, that the Ford Motor Company produces one basic product: motor vehicles. It may face a rather different set of competitors for its trucks than for its sedans, however. If this is the case, and if an antitrust case centers on Ford trucks, a proper analysis may focus on the market for trucks, while taking into account supply-side and demand-side constraints from outside that market. Firms that do not produce trucks may not belong in the relevant market, though the ease with which they could enter that market should be considered.
103. It is also important to determine the competitive constraints faced by the App Store and the extent to which other platforms are sufficiently substitutable from the perspective of developers or consumers to be included in the market. For a transaction platform, the relevant question is reasonable interchangeability of transactions involving groups served by the platform at the center. As a matter of economics, two-sided platforms face competition from other similarly situated two-sided platforms that facilitate transactions between the same two sets of users. As **Exhibit 1** indicates, a large number of firms have chosen, as Apple did, to develop their own app stores.
104. While users and developers of certain apps, such as ridesharing, may not have sufficiently substitutable transactions platforms to smartphones and tablets, for other apps, in particular games such as *Fortnite*, developers and end users have many reasonably substitutable transactions platforms, including consoles, personal computers, streaming services, smart TVs, and virtual reality gear. The competitive conditions for digital game transactions may be different from those of non-game transactions because of the presence of significant transaction platforms that focus exclusively on digital game transactions, *e.g.*, the PlayStation Store and Nintendo eShop. I therefore disagree with Dr. Evans' assertion that "[l]ooking only at one category of demand, such as for games, would not accurately capture the nature of the competition that these platforms face."⁴⁵
105. Apple's conduct at issue may have different competitive effects depending on the app or app genre at issue. When it comes to market definition—which is, after all, simply a tool for helping to measure competitive effects—a market like Dr. Evans' market that encompasses every app in the App Store is unlikely to be informative. The App Store

⁴⁵ Evans Testimony, at ¶ 39.

contains apps dealing with crocheting and biochemistry, among a wide variety of other subjects. The notion that transactions involving all these app are reasonable substitutes for consumers or developers for transactions involving game apps seems implausible. Dr. Evans has certainly offered no evidence on this point.

106. The relevant product market for game transactions is certainly broader than the App Store. I do not have sufficient data to conduct an empirical SSNIP test to delineate with precision the boundaries of the relevant product market; neither does Dr. Evans. Nor is it necessary to conduct such a test to reach sound conclusions. If the data were available, I believe that a properly conducted hypothetical monopolist test would lead to the conclusion that the relevant market for game transactions is broader than the App Store.
107. As Professor Hitt shows, the facts on the ground are clear: the quantitative and qualitative evidence demonstrates that Epic and similarly situated game developers transact with customers across a wide range of transactions platforms, including on consoles such as Sony PlayStation, Microsoft Xbox, Nintendo Switch, as well as on personal computers and mobile devices such as smartphones and tablets. In addition, cloud-based streaming services may soon become meaningful competitive constraints to all other game transaction platforms. I therefore agree with Professors Lafontaine and Hitt that a relevant product market for game transactions on digital transaction platforms is the appropriate antitrust market to assess Epic's claims in this matter.

B. Implications for Assessing Market Power

108. As discussed above, unlike one-sided businesses, two-sided platforms tend to have a skewed pricing structure. Platforms often charge zero or even a negative price to one side if demand is highly price-sensitive and/or if its participation is critical to attracting members of the other side. Furthermore, the profit-maximizing, non-predatory price charged on one side may be above, equal, or below the marginal cost specific to that side. The App Store's asymmetric and complex pricing structure reflects differences in the price elasticities of the two sides and the strengths of the indirect effect that each exerts on the other, and a desire to encourage small developers and free apps.
109. If the prices charged by a two-sided transaction platform have not changed, their level provides no information regarding market power. Whatever market power a platform may have, if, like the App Store, it has only reduced elements of its price structure over time, it has not exercised market power.

1. Dr. Evans Wrongly Asserts that High Operating Margins Imply Monopoly Power

110. As evidence of Apple's purported monopoly power in app distribution, Dr. Evans points to the supposedly high profits earned by Apple from the App Store, relying on analysis by Mr. Barnes, an accountant.⁴⁶

⁴⁶ Evans Testimony, at ¶¶ 146, 148.

111. First, high accounting profitability, even of a stand-alone business, does not establish the existence of market power, let alone monopoly power. It is well-known that accounting profitability can be a very poor measure of true, economic profitability, particularly for businesses that make substantial investments in intellectual property.⁴⁷ Moreover, while a persistently high economic profit rate is suggestive of market power, it is by no means dispositive.
112. Mr. Barnes' comparison of the App Store to other online platforms such as eBay, Etsy, Rakuten, and Mercado Libre ignores the fact that many other successful technology companies, large and small, earn similar, and at times higher, operating margins than Apple as returns on their intellectual property.⁴⁸ **Exhibit 2** summarizes operating profit margins of publicly-traded companies, for which financial statements are publicly available, that operate online stores in **Exhibit 1**. Though Epic is not publicly traded, I also include its operating margins based on financial information produced in this matter.

Exhibit 2: Operating Profit Margins of Publicly-Traded Companies that Operate Digital Distribution Platforms as Listed in Exhibit 1
2017–2020

Company Name	Platform(s)	Net Assets (\$ millions)	Market Cap. (\$ millions)	Operating Profit Margin %			
				FY 2017	FY 2018	FY 2019	FY 2020
Samsung Electronics Co., Ltd.	Galaxy Store	253,566	487,542	22.4	24.2	12.1	15.2
Alphabet Inc.	Google Play	222,544	1,385,885	26.1	23.8	22.5	22.6
Microsoft Corporation	Microsoft Store, Bethesda.net	130,236	1,778,077	30.4	31.8	34.1	37.0
Facebook, Inc.	Oculus	128,290	764,315	49.7	44.6	41.0	38.0
Amazon.com, Inc.	Amazon Appstore	93,404	1,555,758	2.3	5.3	5.1	5.9
Apple Inc.	Apple App Store, Mac App Store	66,224	2,031,863	26.8	26.7	24.6	24.1
Sony Corporation	PlayStation Store	52,723	128,602	5.8	8.7	9.8	10.4
Nintendo Co., Ltd.	Nintendo eShop, Nintendo Wii Shop Channel	16,823	66,283	6.0	16.8	20.8	26.9
LG Electronics Inc.	LG SmartWorld	16,119	22,913	4.0	4.4	3.9	5.1
Activision Blizzard, Inc.	Battle.net	15,037	72,079	18.9	26.6	26.9	35.0
Electronic Arts Inc.	Origin	7,963	37,532	25.6	27.8	20.4	26.2
Aristocrat Leisure Limited	Big Fish Games	2,280	17,082	31.8	26.1	25.0	12.7
BlackBerry Limited	BlackBerry World	1,803	6,703	-12.5	-11.4	-4.8	-16.3
Ubisoft Entertainment SA	Ubisoft Connect	1,788	9,609	13.8	15.0	11.3	2.6
J2 Global, Inc.	Humble Bundle	1,211	5,417	22.2	21.8	20.7	23.7
HTC Corporation	VIVEPORT	1,071	833	-28.1	-58.8	-98.4	-121.5
Opera Limited	Opera Mobile Store	1,047	1,383	6.2	26.6	22.4	0.1
Modern Times Group Mtg AB	Kongregate, Kartridge	635	1,360	7.5	-4.2	-3.7	1.9
CD Projekt S.A.	GOG.com	280	5,945	51.9	31.0	37.5	44.7
RealNetworks, Inc.	RealArcade	46	201	-23.0	-30.0	-15.9	-16.3
Epic Games	Epic Games Store	2,696	N/A	28.5	59.9	30.0	15.0

Source: DX-4861

113. A simple example illustrates the basic problem with using the operating margin as an estimator of profitability without taking into account firms' investments in intellectual

⁴⁷ Fisher, Franklin M. and John J. McGowan, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review*, 73(1), 1983, pp. 82-97, at p. 82; Bork, Robert H. and J. Gregory Sidak, "The Misuse of Profit Margins to Infer Market Power," *Journal of Competition Law & Economics*, 9(3), 2013, pp. 511-530, at pp. 514-515.

⁴⁸ Written Direct Testimony of Ned S. Barnes, CPA, *Epic Games, Inc., v. Apple Inc.*, No. 4:20-CV-05640-YGR, United States District Court for the Northern District of California, Oakland Division, May 3, 2021 ("Barnes Testimony"), at ¶¶ 25-27.

property and other assets. Consider a set of Kansas wheat farms, none of which has any market power. Because soil fertility varies, so will wheat harvests per acre, and thus so will operating margins. But farms with more fertile soil will be more expensive to buy, and under perfect competition, the higher cost of farms with better soil will just compensate for their higher operating margins, and buying and operating any of the farms will yield roughly the same competitive rate of return.

114. In this industry, intellectual property plays the role of soil fertility. Successful investments in intellectual property create an asset that sustains positive operating margins. If one just looks at operating margins and ignores the investments in intellectual property on which they rest, one is biased toward finding market power where none exists, just as ignoring the costs of Kansas wheat farms and looking only at their operating margins would mislead one into thinking that some of them have market power.

2. Mr. Barnes' Estimate of the App Store's Operating Margin Relies on an Inevitably Arbitrary Allocation of Joint Costs and is Accordingly Unreliable

115. It makes no sense to try to measure the App Store's profitability in isolation; it is a part of the iOS platform and relies on all of Apple's intellectual property. The costs associated with that asset are joint costs that simply cannot be allocated in an economically defensible way to individual operating segments.⁴⁹ (The classic example of a joint cost is the cost of raising a steer that yields both meat and hide. Any allocation of that cost between meat and hide is purely arbitrary.) Thus any accounting measure of the App Store's stand-alone profitability is also arbitrary and thus unreliable as an indicator of anything.⁵⁰ As top Apple executives will testify, Apple does not calculate P&Ls by products and services because they view it as an unproductive exercise. **Exhibit 2** shows that in comparison with other firms with substantial investments in intellectual property, Apple's operating margin is unremarkable.
116. In the iOS business, research and development (R&D) and related expenses are a clear and important example of a joint cost. R&D investment that adds useful features to the OS or to iPhone hardware, for instance, is likely to increase iPhone sales. It is also likely to make

⁴⁹ Epic Games' financial statements also highlight how margins can vary across different products and that joint costs cannot be allocated to different products arbitrarily. For example, in 2018, Games had a gross margin of 66 percent, while the Epic Games Store had a gross margin of 12 percent. Corporate expenses and operating expenses related to online services were not divided across Games, Engine, and the Epic Games Store. *See* EPIC_00001689.

⁵⁰ Mr. Barnes' accounting estimates rely on documents that use economically arbitrary methods of allocating joint costs, such as revenue-based allocation, which ignores the fact that the App Store's share of Apple's revenue may be a very poor indicator of the extent to which it benefits from various joint costs.

developing apps for those phones more attractive, thus stimulating transactions on the App Store. Similarly, investments that makes the App Store more user-friendly, whether or not they are formally classified as R&D, will both stimulate usage of the App Store and make it more attractive to own an iPhone, thus stimulating iPhone sales.

117. Dr. Evans argues that the App Store's operating margin implies that it does not need a 30 percent commission rate to be profitable.⁵¹ This suggestion seems unrelated to any allegations in Epic's complaint. Moreover, as an economic matter, it is unclear why Dr. Evans focuses on only one element of Apple's pricing policy. Like any profitable business, Apple could, of course, alter its pricing structure, including iPhone, iPad, and App Store prices, in a variety of ways. If it were forced to change any element of that structure, it would likely find it optimal to change other elements in response.
118. Platforms' pricing structures reflect the patterns of price sensitivities and indirect network effects they face. It is true that many platforms earn most or all of their profit from only one of the groups they serve. But, despite Dr. Evans' suggestions to the contrary,⁵² Apple is hardly unique in earning profits from both groups it serves. Apple's pricing structure is not a sign of market power or of its absence. Nor is any supposed change in the App Store's business model after Steve Jobs' 2008 statement that it would be run on a break-even basis.

3. The Available Reliable Evidence Indicates that the App Store Lacks Monopoly Power

119. Market share is sometimes used as an indicator of market or monopoly power. In using a firm's market share for this purpose, it is important to consider its durability, that is, its ability to persist for a significant period without being eroded by competitive entry or expansion. In the absence of significant barriers to new entry or expansion, a firm with large market share today could find its share and its market power reduced rapidly over time. As **Exhibit 1** shows, many new online platforms—a number of which are focused on games—have entered since the App Store launched. Not only do entry barriers seem low, but there are no obvious barriers to the expansion of output by other platforms if the App Store were to engage in monopolistic price increases. The online platform world is not like brick-and-mortar retailing: output expansion does not require building and staffing new physical facilities.
120. As Android and YouTube illustrate, success can come quickly in platform businesses. When a two-sided platform attains critical mass with sufficient numbers of participants on both sides, the platform becomes attractive to members of both groups served, and organic growth ensues. Emerging gaming platforms without a significant output share today such as Stadia, Luna, or GeForce Now can still constrain the App Store because of the threat that they can leverage indirect network effects and grow rapidly. On the other hand, when users on one side of a platform defect, the platform becomes less attractive to the other group of

⁵¹ Evans Testimony, at ¶ 182.

⁵² Evans Testimony, at ¶ 16, characterizes OSs as having either a “user pays” or “developer pays” model.

users, and a rapid downward spiral can ensue. Shares of gaming platform sales can be eroded quickly, and shares of mobile operating systems have also eroded over time.

121. Epic alleges that market imperfections such as imperfect information and switching costs effectively lock consumers into their initial choice in the market and prevent them from substituting away from it. Since the App Store is a two-sided transaction platform, both sides must be considered in order to evaluate that allegation.
122. On the consumer side, one needs to take into account ownership of multiple devices on which games are played. Even if, hypothetically, a consumer who purchased an iPhone were to become locked in to using only iOS phones for the foreseeable future, games such as *Fortnite* can be played and are played on multiple devices. Many consumers have access to multiple devices and could acquire games and game-related digital content on other platforms—and, in many cases, enjoy the content purchased on these other platforms even on their iOS devices.
123. On the developer side, many game developers that use the App Store also develop for other platforms and reach consumers through other online platforms. If Apple were to raise prices for developers to monopolistic levels or to decrease developer support substantially, developers could switch their efforts away from work on iOS because they can reach potential customers through other platforms. If developers were to do this, the attractiveness of the App Store to consumers would be decreased; they would acquire game-related digital content elsewhere.
124. Apple must also provide app developers incentives to develop and maintain their apps for the iOS platform, instead of competing platforms. As I noted previously, competing platforms do not generally seek to persuade developers to permanently abandon rival platforms. Nonetheless, Dr. Evans assumes that developers have only two options: to continue operating in the App Store or to leave the platform.⁵³
125. I have seen no evidence to conclude that Apple has monopoly power in the market for digital game transactions. Moreover, based on the facts and evidence I have reviewed, I agree with Professor Hitt's conclusions regarding Dr. Evans' assessment of market power. Specifically, Professor Hitt's conservative definition for the market for digital game transactions shows that Apple's share is 37.5 percent, and ranges from 23.3 percent to 27.4 percent when taking into account one-sided competition that Dr. Evans deems relevant. Moreover, Apple's share is likely to further erode as new platforms that facilitate digital game transactions enter the relevant market, illustrating that barriers to entry are low.
126. In the medium to long run, the extraordinarily innovative industry that produces mobile and gaming apps means that the needs of developers and consumers are constantly evolving. Apple will need to continue to innovate to remain competitive. Failure to meet the evolving needs of developers could have drastic consequences.

⁵³ Evans Testimony, at ¶¶ 131-134.

C. Implications for Assessment of Competitive Effects

127. The competitive effects of actions by or policies of a transaction platform such as the App Store must be analyzed by considering impacts on the market as a whole, on the price and volume of transactions—the platform’s product. It makes no economic sense to consider a single side in isolation.
128. The ultimate test of the competitive impact of challenged conduct is its effects on the total transaction price, taking into account charges to both sides. When it is difficult to summarize a complex pricing strategy, the volume of transactions can be considered instead. As Dr. Evans and I stressed in our amicus brief in the Amex case, in the case of a transaction platform “To determine whether a constraint is anticompetitive, the presumption at the first stage of the rule of reason should be to consider the impact on both sets of customers, on how much they jointly pay and, ultimately, on the overall output of the jointly consumed service.”⁵⁴
129. The analyses put forth by Professor Hitt use a reasonable methodology that accounts for the two-sided transaction pricing, and they show rapid output growth with no evidence of constraints from the App Store’s pricing policy.
130. Dr. Evans does not address the voluminous evidence indicating that the effect of Apple’s policies has been to produce a healthy, thriving ecosystem that has brought enormous benefits to developers and consumers and yielded Apple a return on its investments in intellectual property. As noted above, despite Dr. Evans’ argument that Apple has had monopoly power since 2010,⁵⁵ App Store commission rates established two years earlier have not increased. However, as Professor Hitt has shown, total output on the App Store in terms of transactions and revenue from developers have increased dramatically. The number of game transactions has grown from 0.25 billion in 2008 to 3.52 billion in 2019. From 2010 to 2018, total revenue earned by developers has increased by more than 2,600 percent. It requires a special lens to look at the evolution of the iOS ecosystem since 2008 and see competitive problems.

VII. Competitive Analysis of a Potential “Tie” Between IAP and App Distribution

131. Dr. Evans contends that Apple conditions app distribution through the App Store on the use of in-app payment processing for digital content for which a payment is required through Apple’s In-App Purchase (“IAP”) mechanism, that this ties two separate products, and, further, that by this tie Apple has restrained trade in or monopolized the market for “iOS in-app payment processing solutions.”⁵⁶

⁵⁴ Brief for *Amici Curiae* Prof. David S. Evans and Prof. Richard Schmalensee in Support of Respondents, *State of Ohio et al. v. American Express Company et al.*, No. 16-1454, Supreme Court of the United States, January 23, 2018, at p. 6.

⁵⁵ Evans Testimony, at ¶ 91.

⁵⁶ Evans Testimony, at ¶ 7.

132. Based on my review of the available evidence, and understanding of platform businesses, I conclude that these claims lack merit. IAP is not a separate product, as required for a tie, but rather an integral part of the App Store transaction platform that enables efficient collection of Apple's commission and provides procompetitive benefits to users and developers. Epic has not shown the existence (let alone competitive harm in) a market for payment solutions in iOS apps, nor separate demand for such a product. But even if IAP and app distribution were separate products, they have not been tied, as developers that use the App Store can—and do—choose forms of monetization that do not require use of IAP.

A. IAP Is an Integral Part of the App Store Transaction Platform and Provides Benefits to Users and Developers

133. When the App Store launched in 2008, it facilitated only two basic types of transactions—free and paid downloads. A developer wanting to offer users the ability to upgrade their app needed to offer two versions of the same app.⁵⁷ This was inconvenient as it required users to download multiple apps and could result in loss of progress.
134. In 2009, Apple introduced in-app purchase capability allowing developers to provide premium features that users would unlock without leaving the app. This innovation made possible the freemium business model, which has become the second most popular on the App Store. IAP is the name attached to the feature of the App Store that handles in-app purchases. The App Store handles in-app purchases exactly as it handled paid downloads before in-app purchasing was enabled: digital content delivery and (with the assistance of a third-party payment processor) payment to Apple and the developer are assured.
135. The App Store provides transactions services involving digital content simultaneously to both developers and consumers. Consumers make payments and receive products, and developers receive payments and deliver products (or have Apple make delivery for them). When the developer expects a payment, delivery of that payment is an integral part of the transaction, and making that payment is an integral part of the transaction for the consumer involved. Analytically, it makes little more sense to separate payment from delivery than to treat the two sides of a transaction platform separately. If a developer wishes to earn revenue from its digital products, app distribution is inseparable from payment.
136. From an economic perspective, IAP is an input into the production of App Store transactions that facilitates value creation for both consumers and developers. There is therefore serious tension between Epic's tying claim and the correct economic teaching in *Amex*: in the case of a transaction platform such as the App Store that supplies one product—transactions—it makes no economic sense to consider inputs into transactions production that are simultaneously engaged as actually or potentially separate markets. IAP in the App Store is no different conceptually from, say, the merchant acceptance in the payment card situation: merchant acceptance was an input that American Express relied upon to produce transactions. IAP is the App Store's centralized payment system and the link to Apple's secure and centralized system used to record sales, manage payments to

⁵⁷ DX -3463.

developers, and collect commissions from developers that utilize the App Store. Without it, Apple would not be able to provide customer support for any issues with in-app transactions. Hence, IAP is an integrated part of the App Store.

137. Dr. Evans claims that “The in-app transaction between a business and a consumer using an iOS app does not have to involve Apple”⁵⁸ Nonetheless, as described below, Apple provides a variety of App Store features that are beneficial to both developers and consumers on an ongoing basis after an app has been initially downloaded. These include (for developers) the ability to update apps and alert new and existing consumers of those updates and (for consumers) the ability to redownload apps, share digital content with family members, and manage subscriptions. Hence, contrary to Dr. Evans’ suggestion, it is entirely reasonable for Apple to charge a commission for transactions between developers and consumers that involve in-app purchases.

1. All Major Online Stores That Charge Sellers Commissions Require the Use of Their Own Payment Systems to Enable Efficient Collection of Those Commissions

138. There are a number of reasons why many, if not most, online transaction platforms have integrated transactions handling, but one seems particularly important. When a transaction involves a contractually agreed-upon payment by the seller to the platform, handling that transaction internally enables the platform to collect that payment automatically. If the transaction were instead handled by a third party that did not automatically remit the agreed-upon payment to the platform, the platform would need to rely on the seller to keep track of what it owes the platform and make timely and accurate payments. Presumably spot auditing, with lawsuits when fraud is detected, would be the only available tool to enforce honesty.
139. For the App Store, which earns commissions on transactions made between approximately 1 billion customers and thousands of developers, many of them small businesses, and earns commissions on hundreds of millions of transactions annually, this would clearly be a much more expensive alternative than in-house transactions management. Without automated processes, a developer using an external payment mechanism could seek to evade a commission owed to Apple, and Apple would have no technological ability to collect any commissions on the sale. Apple might well elect to pass some of the increased cost back to developers.
140. Such restrictions thus serve the same economic function as Amex’s anti-steering rules—if Apple and other platforms could not use their own payment solutions for efficient collection of the commissions they are owed by developers, the potential for developers to free-ride would grow.

⁵⁸ Evans Testimony at ¶ 233.

141. That most online stores require use of their own payment solutions shows that this requirement has nothing to do with market power, but rather with the simple fact that it allows for an efficient and seamless way for platforms to collect commissions. For example, the App Store, Google Play, Sony's PlayStation Store, and Steam all require in-app purchases to go through their own payment systems⁵⁹; yet these platforms operate at a range of different scales. Indeed, four of the five digital platforms cited by Mr. Barnes⁶⁰—eBay, Etsy, MercadoLibre, and Alibaba—charge a commission and require use of their own payment systems to collect it.⁶¹
142. In the case of Epic, every store that distributes *Fortnite* charges a fee on in-app purchases made on their platform using their payment method. These stores include Samsung,⁶² Google Play, Xbox, Sony, and Nintendo. Mr. Kreiner, testifying on behalf of Epic, confirmed that Sony, Microsoft, and Nintendo require Epic to use their own payment processing systems to distribute its products on their platforms, and added that with these platforms, Epic did not take the position that their payment processing functions were “separate products” that Epic was required to use.
143. Dr. Evans now attempts to distinguish the App Store from all the other stores that also require use of their own payment systems for in-app purchases of digital content by arguing that “. . . these stores likely lack substantial market power and developers can therefore choose whether to take the bundle of services or not.”⁶³ He thus now agrees that this requirement has nothing to do with market power. It is important to note, though, that this argument does not work for the game consoles: if a developer wants to sell a Nintendo game online, for instance, it has no choice but to go through the Nintendo eShop and to use that store's payment system for in-app purchases.

⁵⁹ DX-3505; DX-3585; DX-4335; DX-3437; “Microtransactions (In-Game Purchases)”, *Steamworks*, available at <https://partner.steamgames.com/doc/features/microtransactions>, accessed on March 10, 2021.

⁶⁰ Barnes Testimony, at ¶ 25.

⁶¹ “Etsy Payment Policy,” *Etsy*, available at <https://www.etsy.com/legal/etsy-payments/>, accessed on February 24, 2021; “Transaction Services Agreement,” *Alibaba*, January 16, 2021, available at <https://rule.alibaba.com/rule/detail/2054.htm?spm=a271m.8038972.0.0.68df6d82RybX55>; “Form 10-K For the fiscal year ended December 31, 2019,” *MercadoLibre, Inc.*, available at <http://investor.mercadolibre.com/static-files/5cfa8a5d-6208-4cf6-bc76-488daafb7101>, at p. 5; “Managed Payments,” *eBay*, available at <https://pages.ebay.com/seller-center/service-and-payments/managed-payments-on-ebay.html>, accessed on March 10, 2021.

⁶² DX-3067, at 037; DX-4335, at 007.

⁶³ Evans Testimony at ¶ 220.

144. Dr. Evans now argues that IAP is not an integrated part of the App Store “because it is not provided for most apps that are distributed through the App Store.”⁶⁴ It is, of course *made available* to all apps; many simply chose not to use it. As just discussed, most, if not all online stores offer similar options to developers, which suggests these options are close to being an essential feature of online stores in general, even if not all developers make use of them. Meat counters seem to be an essential, integrated feature of U.S. supermarkets, even if vegetarians don’t use them.
145. Dr. Evans refers to IAP as “Apple’s one-size-fits all payment solution.”⁶⁵ But given that a core function of IAP is to efficiently collect App Store commissions, this function will always require a one-size-fits all solution. Since collection of commissions via IAP is automatic, if Apple were forced to cease using IAP and to use another method of collection, it would incur higher costs. It might well pass some or all of that cost increase back to developers. Alternatively, Apple might conclude that reliable alternative methods of collection either do not exist or are prohibitively expensive. In this case, it would decide to cease charging commissions on in-app sales.
146. It seems likely that this is the alternative that Epic prefers. But if Apple were forced to make such a fundamental change in its business model, to depart from what has become an industry standard of charging a commission for at least some in-app purchases, it would almost certainly find it optimal to change other elements of its business model, to the benefit of some consumers and developers and to the detriment of others. Apple’s current iOS business model has worked well for consumers and developers, as growth on both sides of the platform makes clear. There is certainly no guarantee that an alternative model compelled by judicial decree would be any better.
147. Because the recording of sales and the collection of Apple’s commission are the core functions of IAP, Dr. Evans’ claim that the requirement to use it harms competition and innovation in payment solutions (besides being factually wrong) is largely a red herring.
148. To demonstrate, let me return to the art gallery example above. The gallery is a transaction platform connecting artists and art lovers. When an art-lover decides to buy a painting with a credit card, the clerk uses the gallery’s terminal to connect to the gallery’s payment processor. If the transaction is authorized, the payment processor sends the payment for the painting to the gallery’s account. The gallery, in turn, deducts its agreed-upon commission, 30 percent for example, and sends the remainder to the artist. But for the level of technology involved, this is essentially how the App Store operates. Suppose now that an artist comes with her own payment terminal in hand and asks to be allowed to use it. She argues that it is much newer than the gallery’s method, has many great innovative features, is more secure, provides more efficient refunds, and connects wirelessly to the artist’s payment processor, which charges only 5 percent. The gallery would, of course, refuse this request, since it would be essentially an attempt to avoid paying the gallery’s commission,

⁶⁴ Evans Testimony at ¶ 244.

⁶⁵ Evans Testimony, at ¶ 276.

regardless of how innovative the artist's terminal is. This refusal would not be suppression of competition; it would be an insistence on collecting an agreed-upon commission.

2. There Are Other Procompetitive Benefits from Requiring Use of IAP

149. Besides providing an efficient way to implement Apple's platform business model, the integration of IAP provides benefits to both consumers and developers. For consumers, it enables them to conveniently purchase and manage digital content without needing to provide their payment details multiple times. It also ensures a safe and secure marketplace, and supports an ecosystem that syncs content devices.
150. As Apple witnesses will testify, by creating a record of iOS purchases, IAP supports the ability of users to redownload apps and in-app purchase on new devices, share subscriptions and in-app features with family members, view their entire purchase history, and manage subscriptions from one place on their phone. I also understand that IAP protects the privacy and financial information of consumers by withholding such information from developers. All of these are features (which Dr. Evans ignores) which a third-party processor likely could not replicate and make the iOS ecosystem more attractive to consumers.
151. One feature supported by IAP worth spotlighting is Family Sharing. Family Sharing also allows parents to review purchases made by their minor children—an important feature especially for gaming apps that often go to great lengths to tempt kids into buying a new skin or the next level of the game.
152. Apple's IAP integration benefits developers too. Providing payment processing essentially for free to all developers rather than requiring them to develop their own systems or to contract with another third party and integrate that party's in-app payment system can reduce the barriers to entry for developers, particularly small ones.
153. Developers also benefit because, by requiring use of IAP, Apple has superior means of payment collection. For example, Apple can block a customer who commits fraud by repeatedly asking for refunds of consumed purchases across different apps. A third-party developer would not have comparable means. Improving consumer experience indirectly benefits developers; more reliable payment collection benefits them directly.
154. For developers that offer in-app purchases of digital content, IAP provides an effective means to collect its revenues from users.⁶⁶ Moreover, the direct positive effects of the smooth functioning of IAP are complemented by indirect network effects due to the two-sidedness of the App Store. When consumers enjoy a better customer experience, developers indirectly benefit as well due to increasing demand of their apps, and vice versa. In contrast, if some developers deployed third-party payment processors instead of the App Store's facility, their customers' purchase experiences could be less satisfactory, as noted above. Increased friction is likely to make the App Store as a whole less attractive to affected consumers, which, in turn, would make it a less profitable venue for developers.

⁶⁶ In fact, the introduction of in-app purchases to the App Store was at least partly motivated by developers' request for additional monetization options. See DX-4192 at 003.

B. There Is Not Sufficient Demand for In-App Payment Processing as Facilitated by IAP to Support a Market in Which It Is Efficient to Offer the Two Components Separately

155. I understand that under Supreme Court precedent, to evaluate whether a tie exists here, one must assess whether there is sufficient demand for in-app payment processing for digital content, as facilitated by IAP, separate from the demand for app distribution to support a product market in which it is efficient to offer these two components separately.
156. This analysis must first consider carefully the nature of the commissions collected via IAP. Apple's commissions are not a charge for the bundle of services that IAP offers. They are the price that developers pay to take advantage of the iOS platform (including licensed intellectual property rights) and distribution via the App Store, and Apple uses these payments from developers as part of its overall monetization strategy. While Apple has insisted on collecting commissions that developers are contractually obligated to pay, I understand it has never charged separately for payment processing. And to my knowledge Apple has never tried to market IAP or its technology to other online platforms.
157. Still, if one takes Epic's tying claims at face value and narrowly focuses on the functions performed by IAP, the but-for world would be one where Apple continues to earn its commissions for digital content, but developers can rely on alternative systems to perform those functions. As noted above, however, the App Store does not charge for the fees it pays to third-party payment processors, and developers have a contractual obligation to pay a commission to Apple for in-app purchases. Thus, even if developers were allowed to use third-party payment processing systems, any developer using such a system instead of IAP would have to pay that processor's fees in addition to the commission that it is contractually obligated to pay Apple.⁶⁷
158. In a but-for world where Apple continues to earn a commission on in-app purchases, no rational developer would forgo payment processing via IAP offered essentially free of charge for an alternative—inferior in a number of respects—that would charge a positive price for payment processing. Therefore, there would not be sufficient demand for in-app payment processing for digital content for it to be efficient to offer in-app payment processing for digital content as a stand-alone service.
159. This is illustrated by the Epic Games Store, where the majority of games still use Epic's payment system even though the Epic Games Store began to allow developers to use payment mechanisms other than Epic's. According to Mr. Allison, the General Manager of the Epic Games Store, using a third-party payment processing system instead of Epic's payment processing mechanism may actually *reduce* demand in the platform, because users would be required to set up a separate account for each third-party payment processor,

⁶⁷ Apple's commission rate is 30% of the price to the user. Apple absorbs the cost of payment processing fees and does not charge developers an additional payment processing fee. *See* DX-4623, at 005; DX-3256 at 003-004.

creating “eCommerce friction.”⁶⁸ Instead, Mr. Allison argued that an integrated payment service helps facilitate the payment process for users and developers.

160. It is not clear what Dr. Evans is assuming about a world in which the use of IAP is optional. If switching away from IAP somehow enabled developers to avoid payment of the commissions to which their contracts obligate them, it would not be surprising that ““no one will ever use it”” as said the Apple executive Dr. Evans quotes in his testimony.⁶⁹ Since third-party payment providers charge 2-3 percent, while large developers would pay Apple’s 30 percent if they continued to use IAP, it is hard to see why any large developers would not abandon IAP if doing so would enable them to avoid Apple’s commission. Even small developers, who owe Apple a 15 percent commission on in-app sales, would have strong incentives to switch from IAP to third-party processors if doing so would enable them to avoid that commission.
161. Alternatively, in a scenario in which switching to a third-party processor would not relieve developers of their contractual obligation, it is hard to imagine that many would switch. Dr. Evans has admitted that IAP provides a convenient payment method for both developers and consumers.⁷⁰ He further acknowledges that IAP may be particularly attractive for smaller developers “because it would allow them to avoid the fixed costs associated with managing a payment solution.”⁷¹ It is my understanding that Apple does not charge developers for the payment processing fees that it pays to third parties to handle payments that go through IAP. If switching away from IAP obliged a developer both to pay the commissions it owed Apple (assuming Apple had some way reliably to collect) and third-party payment processing fees, its costs would have increased.
162. Although there are indeed plenty of third-party payment processors that serve a large market, Dr. Evans’ suggestion that they could replace IAP⁷² is plainly false. IAP is not just a payment processor. Importantly, it serves to collect Apple’s commission on paid apps and in-app payments in an efficient fashion, and Apple’s commission, like the Epic Game Store commission, is not a fee for payment processing. If one or more developers were to replace IAP with a third-party payment processor, Apple would no longer automatically receive the commission payments to which it is contractually entitled. Neither Epic nor Dr. Evans has demonstrated that there is any practical alternative method to reliably collect commissions from developers with apps in the App Store. Nor, indeed, has either made a serious attempt to do so.

⁶⁸ See Allison Deposition, Vol.1, at 244:2-244:20.

⁶⁹ Evans Testimony, at ¶ 278.

⁷⁰ Evans Testimony, at ¶ 260.

⁷¹ Evans Testimony, at ¶ 245.

⁷² Evans Testimony, at ¶ 269.

163. In light of all this, the fact that many developers, including Match Group, Facebook, and Spotify—and, of course, Epic itself—have tried to circumvent IAP and use their own payment processors instead does not provide any valid evidence that there is a separate demand by these developers for such services. It simply documents the unsurprising fact that developers would prefer not to pay a 30 percent commission for Apple’s services and the use of its intellectual property and would prefer to pay a lower price or none at all. Dr. Evans alleges that on one occasion, Microsoft expressed a willingness to pay the App Store’s commission if it could use an alternative payment processing system, but Apple refused to allow it.⁷³ Whatever the value of this anecdote, Apple’s ability to collect its commission from Microsoft says nothing about its ability to collect from many thousands of other developers without using IAP.

C. Dr. Evans’ SSNIP Analysis of an “iOS In-App Payment Solution Market” Is Fatally Flawed

164. To support his theory that Apple has tied use of IAP to iOS app distribution, Dr. Evans claims that “the relevant market is the market for payment solutions for accepting and processing payments for purchases of digital content made within an iOS app.”⁷⁴ To reach this conclusion, he implements a third SSNIP test—this one just as convoluted and uninformative as the previous two.
165. First, Dr. Evans asserts that “the average transaction fee for a developer’s own payment solution is 5%” based on data from third-party payment processors and Epic.⁷⁵ He then calculates that assuming 20 percent of in-app transactions in iOS would use a third-party payment processor if they could, the average commission would be 23.2 percent. He finds that “the App Store was able to raise the average commission from the competitive level by at least 4.5 percentage points, from 23.2% to 27.7%” durably and profitably, which is 19.4 percent higher than 23.2 percent.⁷⁶ As a result, Dr. Evans concludes that “[t]he App Store, as the hypothetical monopolist, can [...] raise the price of payment solutions to the targeted group of developers by a substantial amount.”⁷⁷ That is, he claims that payment handling for digital content purchased within an iOS app has passed the hypothetical monopolist/SSNIP test because Apple, “the actual monopolist”⁷⁸ has been able to hold price appreciably above the competitive level.
166. Dr. Evans’ third SSNIP test relies on the assumption that the App Store commission rate is properly comparable to the payment processing fees charged by Paypal, Braintree and

⁷³ Evans Testimony, at ¶ 242.

⁷⁴ Evans Testimony, at ¶ 247.

⁷⁵ Evans Testimony, at ¶ 259.

⁷⁶ Evans Testimony, at ¶ 262.

⁷⁷ Evans Testimony, at ¶ 263.

⁷⁸ Evans Testimony, at ¶ 267.

others. As Apple's witnesses will testify, that is nonsense. The App Store provides numerous services to attract and retain both end-users and developers, and it is a critical part of the broader iOS platform, from which users and developers benefit. The alleged competitive level of payment processing fees cited by Dr. Evans covers only services related to payment processing for in-app transactions, but the commission rate in the App Store is not a fee for payment processing; it is the price developers pay for the full array of benefits provided by the App Store and the iOS platform.

167. Like many other app store operators, Apple relies on third-party payment processing firms to execute payments, and it pays the charges of those firms.⁷⁹ Since platforms' commission rates include the cost of payment processing by a third party as well as serve as part of the monetization strategy of the store itself, the commission rates charged by app stores, including Epic's Game Store's 12 percent, are generally well above the rates charged by the payment processing firms. As Mr. Sweeney testified, Epic's 12 percent commission "is intended to cover all of Epic's variable operating costs associated with selling incremental games to customers," including payment processing, bandwidth, hosting servers, any losses from transactions due to payment processing issues or fraud, and customer support. And Mr. Allison, the store's general manager, testified that he views the 12 percent commission as a payment for granting third-party developers the privilege of accessing Epic's audience.⁸⁰
168. And that is not the only faulty input to Dr. Evans' IAP SSNIP test. Here, as throughout his analysis, Dr. Evans miscalculates the App Store's effective commission rate to be 27.7 percent.⁸¹ What Dr. Evans actually calculates is the App Store's commission rate across paid transactions, ignoring all free transactions. But the vast majority of apps in the App Store are free to download and offer no in-app purchases. As Professor Hitt has shown, taking those into account puts Apple's effective commission in 2019 at less than 5 percent.
169. Numerical quibbles aside, however, Dr. Evans' market definition has a more fundamental flaw. He advances no reason why payment processing on iOS would be a market distinct from online payment processing in general. In fact, many payment processors that currently handle payment processing for purchases of physical goods or services in the App Store (e.g., Square and Braintree) also handle other transactions online. Thus even if one were to define a market for payment processing limited to iOS, no firm, and certainly not Apple, could exercise market power in that market because entry would be very easy.
170. Some context about relative sales volumes is instructive. The total dollars transacted through the App Store's U.S. storefront in 2018 was [REDACTED], which is small relative to both 1) the total payment volume reported by online payment processing companies such as Braintree (a PayPal subsidiary), Square, and Adyen and 2) the total e-commerce payment volume in the U.S. Total dollars transacted through the App Store's U.S. storefront in 2018

⁷⁹ See, e.g., DX-3122.

⁸⁰ Allison Deposition, Vol.1, at 222:12-15.

⁸¹ Evans Testimony, at ¶ 136.

was at most 3 percent of the total dollars processed in the U.S. by online payment processing companies and less than 0.2 percent of the total e-commerce volume in the U.S. in 2018. The notion that Apple is employing a tie to achieve market power is not an economically credible one.

D. Apple Does Not Require Use of IAP as a Condition of App Distribution Through the App Store

171. Lastly, even if app distribution and payment solutions are separate products, there is no “tie” here because Apple does not even require that developers monetize their app by offering in-app purchases of digital content or require payment for any app in order to take advantage of app distribution through the App Store.
172. Offering in-app purchases of digital content or charging for an app are only two of the many options offered to developers to monetize their apps in the App Store. No developer is required by Apple to use either of these monetization strategies. The distinct business models that involve in-app purchases are the Freemium model, offered by a little less than a third of developers, and the Paymium model, offered by only 6 percent of developers.⁸² In addition, 84 percent of apps are completely free, and developers pay no commission to Apple for them.⁸³ Apps that offer physical goods or services do not use IAP—in fact, Apple requires that these apps use non-IAP payment processing.
173. Dr. Evans now refers to developers who choose to use IAP as a “targeted group,” comparing them to “a group of customers that are isolated in a hard-to-reach geographic area.”⁸⁴ This label makes no sense. The developers who have chosen to use IAP were aware of the existence of alternative monetization strategies when they made that choice, and they can reverse that choice at any time. The comparison to isolated communities suggests ambush of immobile customers, but developers are not immobile, and Apple has never increased commissions to ambush anyone.
174. Even in instances where the app developer uses a Freemium model, such as *Fortnite*, iOS users can make in-app purchases on other platforms and use those upgrades on iOS without IAP. In particular, iOS users can download *Fortnite* for free from the App Store and use V-Bucks purchased on other platforms to acquire in-game content while playing *Fortnite* on iOS. By definition, the use of IAP cannot be said to be tied to app distribution through the App Store.

⁸² DX-3512, at 010; DX-4614.

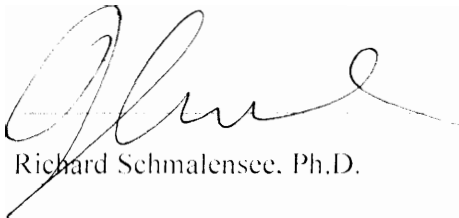
⁸³ DX-3055.

⁸⁴ Evans Testimony at ¶¶ 248, 253.

VIII. Oath

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Respectfully submitted,



Richard Schmalensee, Ph.D.

April 23, 2021

Date

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